

Satellite Imagery via Personal Computer



Tiros 1, the world's first weather satellite launched by NASA in 1960, was a marvel for its day but a technological Neanderthal compared with today's highly sophisticated environmental satellites. Among other limitations, processing the cloud cover pictures was a complicated matter in which the TV camera signals

had to be stored and transmitted later to a few Earth stations that had the special equipment necessary to convert the data photographic form.

With Tiros 8 in 1963, NASA introduced a major improvement called APT, for Automatic Picture Transmission. APT included an advanced satellite camera that snapped a picture and immediately began transmitting it, plus simplified, low cost receiving equipment for the ground stations. This development made satellite weather images directly and immediately available to anyone willing to make the moderate investment in an APT ground station, thus extending the benefits to weathermen around the world, to commercial TV stations, to colleges and universities, even to private individuals who built their own receivers. By 1966, when the Tiros system graduated from research to operational status, there were more than 300 ground stations, many of them on foreign soil. Eventually, more than 100 foreign nations took advantage of NASA's pledge to make space benefits available "to all mankind."

NASA continued to work on APT and later introduced an advanced scanning radiometer that upgraded the quality of weather pictures but created a problem: most Tiros system users were still operating their original ground station display equipment, which would not readily be adjusted to the new APT format. To accommodate many foreign and other APT users, Goddard Space Flight Center developed an APT Digital Scan Converter that electronically altered the APT data received from a satellite to make it compatible with the older electromechanical display systems.

Goddard's Charles H. Vermillion and John C. Kamoski wrote a comprehensive NASA Technical Note, a voluminous report published in 1975, that described their Digital Scan Converter in complete detail, with construction plans, circuit and wiring diagrams,

***Highlighting spinoff
examples in the field of
computer technology is a
low cost means of access
to weather satellite
information***

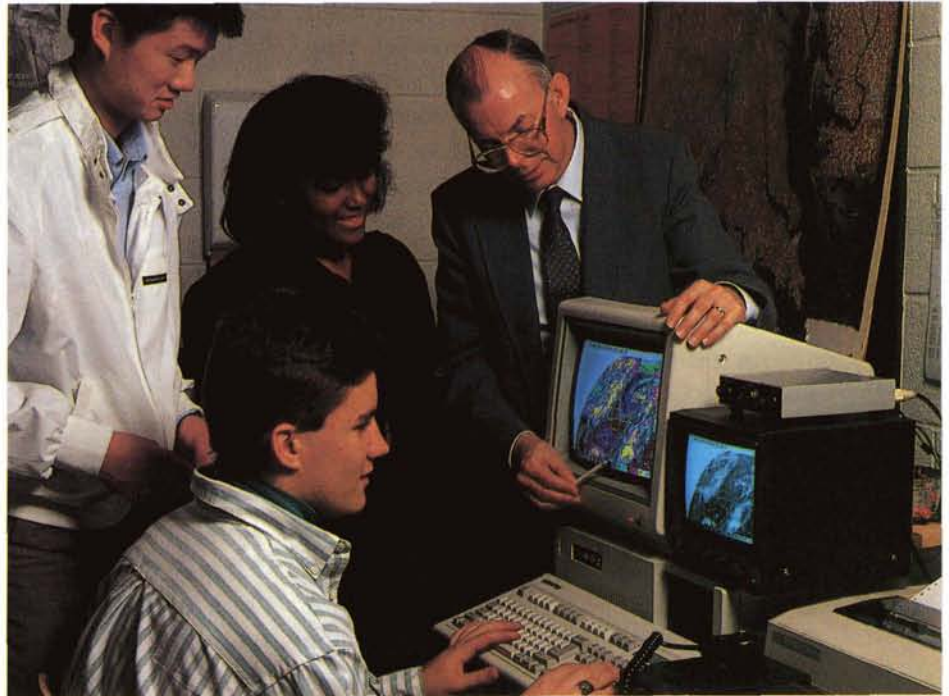
photos, drawings and dimensional data from which anyone competent in digital electronics could build his own converter with off-the-shelf components readily available in most parts of the world. That Technical Note became the basis for a new product and a complete change of business activity for Electro-Services®, Cleveland, Minnesota, then specializing in maintenance of computer and video systems.

The company used the Goddard technology as a departure point for what became, in 1979, the first microcomputer-based weather imaging system in the U.S. The promise of this system prompted the company to sell off its computer/video maintenance assets in 1984 and embark on a new business mission: design and marketing of a weather image display product for personal computers, including both hardware and software. In 1988, the company's name was changed to Satellite Data Systems Inc. (SDS) to reflect its new activity.

SDS's product is the low cost Electro-Services WeatherFax facsimile display graphics system, which consists of a single ESC-102 plug-in card derived from the NASA technology, software, an instruction manual and an easily-installed connecting cable. The system converts a personal computer into a weather satellite image acquisition and display workstation. A WeatherFax unit for an IBM personal computer costs less than \$800.

SDS also offers computer hardware, antennas, receivers and other associated equipment, provides "do-it-yourself" systems and full turn-key systems that include installation and operator training.

The company markets its products worldwide, with installations in the U.S., Canada, Europe and the Far East. A major customer is the U.S. Weather Service; another area of large scale use is educational training in high schools and colleges. Other customers include the U.S. military services, foreign governments, professional meteorologists and amateur hobbyists.



Above, Bob Bowles (right) of Paint Branch High School, Burtonsville, Maryland is instructing his Earth Science class in weather analysis with the help of Satellite Data Services' spinoff WeatherFax a low cost unit that converts a personal computer into a satellite image acquisition and display workstation, thus making satellite signal reception affordable for a wider range of users.

At left, Bowles is adjusting one of the satellite reception antennas on the roof of the school; students and teacher installed the antennas themselves.

